

Fall 2002



# Natural News

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*Sediment from the Bad River Entering Lake Sharpe*

### ***South Dakota's Bad River Project - Meeting the TMDL*** ~Jerry Thelen, Project Coordinator and Doug Lofstedt, EPA Region 8

The Bad River Water Quality Project is one of South Dakota's largest and earliest watershed improvement projects. The Bad River Watershed is over two million acres and has historically delivered an annual average sediment load of 3.25 million tons into Lake Sharpe on the Missouri River at Ft. Pierre. Duane Murphey of the South Dakota Department of Environment and Natural Resources' Nonpoint Source Program states that "the Bad River is considered one of the highest priority water quality concerns in the State." The watershed is primarily rangeland, but also has extensive highly erodible cropland, "badlands," and several animal feeding operations. The sediment load has caused severe impacts, such as increased flooding, channel flow restrictions, reduced power generation, and an impaired fishery.

The total maximum daily load (TMDL) goal is a 30 percent reduction in the sediment load. A TMDL is a pollution budget. To meet this goal with an effective implementation program, it took a thorough assessment to determine sources

of sediment and target areas needing intensive treatment. The Stanley County Conservation District volunteered to lead the project with assistance from a wide variety of State, federal, and local organizations. The largest funding contributions have come from South Dakota's State Water Resources Management System, Clean Water Act Section 319 grant funds, and US Department of Agriculture (USDA) cost-share. Since 1990, over \$9 million has been invested in practices such as planned grazing systems, erosion control structures, livestock pipelines and tanks, conservation tillage, and strip cropping. This includes at least 25 percent cash contributions for construction practices from the landowners and operators. Technical assistance primarily comes from the USDA Natural Resources Conservation Service.

Ted Turner recently purchased approximately 150,000 acres in the watershed for a bison ranch. The ranch operators have been working with project staff to re-establish native vegetation on cropland and develop an environmentally sound grazing management program.

So what has been achieved? The initial phase of the project, which ran from July 1990 through April 1995, had 90 percent landowner participation. Due to this participation, 95 percent of the land had a higher level of management to reduce erosion. Data from the Army Corps of Engineers in 2001 show that the Bad River currently delivers 1.95 million tons of sediment per year. This is a 40 percent reduction, based on an average of US Geological Survey data from 1972 through 1997, which exceeds the TMDL. The Bad River Watershed is also one of the EPA-funded national nonpoint source monitoring

*(Continued on page 2)*

projects. The study is on-going with results yet to be published. Everyone involved is justifiably proud of the results achieved.

Several “keys to success” have been identified:

- Stress the voluntary nature of cooperator involvement
- Meet the desires of the cooperator while maintaining the integrity and technical correctness of the practices
- Develop agreements with a win-win outcome
- Technical staff need to have appropriate technical capabilities and training, yet be practical so that potential cooperators are not alienated
- Develop cost-share packages that are creative and involve non-traditional parties as partners

For additional information, contact **Jerry Thelen** at (605) 223-2253 or [brjerry@dakota2k.net](mailto:brjerry@dakota2k.net)

### ***Celebration of Clean Water Act 30<sup>th</sup> Anniversary***

~Contributed by Stacey Eriksen, EPA Region 8



To help celebrate the 30<sup>th</sup> anniversary of the Clean Water Act and the Year of Clean Water, EPA Administrator, Christie Whitman, announced the first National Water Monitoring Day and encouraged everyone to take part by monitoring his/her local water quality on October 18<sup>th</sup>.

“Most Americans would agree that

the quality of our water has improved dramatically over the past quarter century although there is still much to be done,” said Whitman. Please see enclosed brochure for more water-related information.

### ***Governor’s Upper Yellowstone River Task Force***

~Liz Galli-Noble, Task Force Coordinator

In response to a request from the citizens of Park County, Montana’s former Governor, Marc Racicot, created the Yellowstone River Task Force in November 1997. County residents had experienced back-to-back, near 100-year floods in both 1996 and 1997, and consequently requested that a more comprehensive and consolidated planning effort for the upper Yellowstone River be formed.

The purpose of the Task Force was “to provide a forum for the discussion of issues that affect the Upper Yellowstone River Basin; particularly, to bring together landowners, sportsmen and sportswomen, and community leaders to develop a shared understanding of the issues and competing values and uses that impact the upper Yellowstone River.” Further, the Task Force was directed to “ensure that future projects affecting the river are planned and conducted in a manner that would preserve the integrity, beauty, values, and functions of the upper Yellowstone River for Montanans now and in the future.”

The Task Force functioned as a structured, non-regulatory organization that involved citizens, communities, and governmental agencies. The overall goal of the Task Force was to develop a set of publicly supported river corridor management recommendations that addressed potential adverse cumulative effects of river channel modification, floodplain development, and natural events on the human community and riparian ecosystem.

From the beginning, the Task Force recognized the need to consolidate efforts in the upper Yellowstone River area and to avoid duplication of effort. The makeup of the Task Force was testament to the power of seating concerned citizens’ groups and governmental agencies as collaborative investigators and decision makers. Having many of the interested parties and agencies charged with regulation of river resources represented on the Task Force, has streamlined much of the research and outreach efforts thus far.

The Task Force appointed a Technical Advisory Committee (TAC) in 1998. The TAC’s role was: 1) to assist the Task Force by offering scientific guidance, 2) to develop an integrated research program, and 3) to evaluate research proposals and results. The TAC also took the lead in data synthesis and interpretation of information for the Task Force.

In 1998, the Task Force TAC set in motion an interdisciplinary study effort to assess the cumulative effects of bank stabilization, channel modification, and natural events on the physical, biological, and cultural attributes of the upper Yellowstone River. The study design consisted of seven interrelated research components:

1. Watershed Conditions and Land Use
2. Geomorphology
3. Hydrology and Hydraulics
4. Riparian Vegetation
5. Fish Habitat and Populations
6. Wildlife Habitat and Populations
7. Socio-Economic

Realistic physically - and biologically-based scenarios were to be developed for analysis with TAC and Task Force oversight. These scenarios were to provide the basis for analyzing the cumulative effects of difficult types and levels of bank stabilization and floodplain modification on the physical and biological environment. In this manner, scientifically sound predictions of how the river and its resources would likely change in response to a particular channel modification or series of modifications would be developed. These analyses would then be used as a basis upon which to develop river corridor management recommendations

Presently, the Task Force is concluding the research phase of the project. Next comes the project synthesis phase of the project, which will provide the insight and

understanding necessary to link information from independent research components into an integrated analysis of the cumulative effects of bank stabilization.

The final project phase will be the development of management recommendations based on an integrated understanding of the upper Yellowstone River. Educating the public, as well as Task Force members, landowners, and regulatory agencies becomes paramount at this point.

For more information, contact **Liz Galli-Noble** (Task Force Coordinator) at (406) 222-3701 or [noble@ycsi.net](mailto:noble@ycsi.net). You may also visit the Task Force website at:

<http://www.upperyellowstonerivertaskforce.org>



*MN Wetland Health Evaluation Project*

*~Photo by Pete Schade*

### **Regional Network Brings Leaders Together**

**~Kristy Hoffman, Rocky Mountain Watersheds Volunteer Monitoring Network**

It's not often that you find a room full of people with a propensity for slugging through thigh-deep muck. Nevertheless, more than 20 program coordinators from the Rocky Mountain Region sorted through the seeming quagmire of wetland monitoring with gusto last June.

Hosted in Park City, Utah by the Rocky Mountain Watersheds Volunteer Monitoring (RMWVM) Network and funded by EPA Region 8, these coordinators of existing or fledgling monitoring programs met to explore topics relevant to citizen monitoring of bogs, fens, marshes, prairie potholes, vernal pools, riparian zones and other wetland types. With the help of outstanding presenters, the three-day event included sessions on:

- Types, values and functions of wetlands
- The roles of the EPA, Army Corps of Engineers, and the US Fish and Wildlife Service in regards to wetlands
- Two models of existing citizen wetland monitoring programs (Minnesota Wetland Health Evaluation Project and Utah Wetland Partners Project)
- Wetland monitoring status across the nation
- Wetland monitoring efforts in Montana and North Dakota

- Biological Assessment of Wetlands Work Group (BAWWG) overview
- EPA's National Wetland Monitoring Strategy
- Existing resources and protocols used by various monitoring entities

In addition to these sessions and opportunities to learn in-depth information about other programs, each participant developed a plan of action for his/her own situation in order to have a road map to follow upon returning home. Participants were overwhelmingly appreciative of the opportunity to examine a topic so pertinent to their efforts.

In July, the RMWVM Network was at it again when they hosted a data management training along with their annual meeting in Brighton, Utah. One might wonder why program coordinators get so wound up when they hear phrases like "Excel spreadsheets," "STORET" (EPA's water quality database), "sequel server," "quality assurance," and "data validation." But the nuts and bolts of data management and interpretation are hot topics for citizen monitoring programs. All leaders in attendance were trying to improve services and methods used by their programs.

Network members shared specifics on how their volunteer monitoring programs manage their water quality data from A to Z. Coordinators swapped spreadsheets, hints on graphing data, and cool web interface ideas. Guest speakers addressed the application of STORET for volunteer monitoring groups and demonstrated new data entry and analysis tools that simplify the use of the STORET system. Pete Schade of Montana Watercourse commented, "the meeting gave me a better understanding of what other programs are doing and I learned about aspects of data management that I hadn't considered."

On the Network's list of 2003 activities are a manual and workshop on creating effective monitoring designs. Watch for upcoming information on training opportunities or contact **Kristy Hoffman**, RMWVM Network Coordinator, at (530) 283-2208 or [khoffman@plumasnet.com](mailto:khoffman@plumasnet.com). For more information on EPA and volunteer monitoring, contact **Tina Laidlaw** at (406) 457-5016 or [laidlaw.tina@epamail.epa.gov](mailto:laidlaw.tina@epamail.epa.gov)

### **Watershed Initiative Proposals Due to EPA by November 21<sup>st</sup>**

**~Contributed by Stacey Eriksen, EPA Region 8**

EPA will be requesting nominations for its Watershed Initiative. The program would provide assistance to state and local communities to protect and restore inland and coastal watersheds.

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Clean and healthy watersheds are the key focus of the Year of Clean Water, which celebrates the 30<sup>th</sup> anniversary of the Clean Water Act. As part of this new Watershed Initiative, the President has requested that Congress appropriate \$21 million for grants to encourage community-based approaches and techniques to protect water resources throughout the country.

Governors and Tribal leaders are being invited to submit nominations to EPA by November 21<sup>st</sup> for projects that would help promote and advance the success of efforts in up to 20 watersheds. Each state and tribe will establish its own process for selecting projects to forward to EPA. Project awards will range from \$300,000 to \$1,300,000 which would be made available in the form of grants to help local entities protect and restore their local watershed. Selection and funding are contingent upon favorable Congressional action on the appropriations request.

The Federal Register Notice and other information about the Watershed Initiative are available at <http://www.epa.gov/owow/watershed/initiative/>. For more information, please contact **Karen Hamilton** at (303) 312-6236 or [hamilton.karen@epa.gov](mailto:hamilton.karen@epa.gov)

### ***EPA Region 8 2003 Consolidated Funding Process***

**~Pam Dougherty, EPA Region 8**

October 1, 2002 was the release date for the *Fiscal Year 2003 Request for Proposals (RFP) under the U.S. Environmental Protection Agency Region 8 Ecosystems Protection Program (EPP) and Water Program (WP) "Consolidated Funding Process."* This funding process allows each participant to make one proposal submission to be considered for *multiple sources* under four different Clean Water Act section 104(b)3 programs including Regional Geographic Initiative, Wetlands, National Pollution Discharge Elimination System (NPDES), and Total Maximum Daily Loads (TMDLs). **This year, proposal(s) must be received in our office by close of business December 3, 2002. Applicants are required to submit both an electronic and hardcopy version of their proposals.** If you did not receive a copy of the RFP or if you need preparation guidance, program criteria, or additional information such as updates, process schedule, and program-specific guidance, please check our website at <http://www.epa.gov/region08/cfp>

EPA Region 8 is pleased that we have been able to support projects proposed by state, tribal, local, and non-governmental organizations and we are confident that this program will continue to provide significant assistance for environmental restoration and protection throughout Region 8. We look forward to receiving your proposal. Should you have any initial questions, please feel free to contact **Pam Dougherty**, Program Coordinator, at [dougherty.pam@epa.gov](mailto:dougherty.pam@epa.gov)

### ***Web Highlights***

**~Contributed by Stacey Eriksen, EPA Region 8**

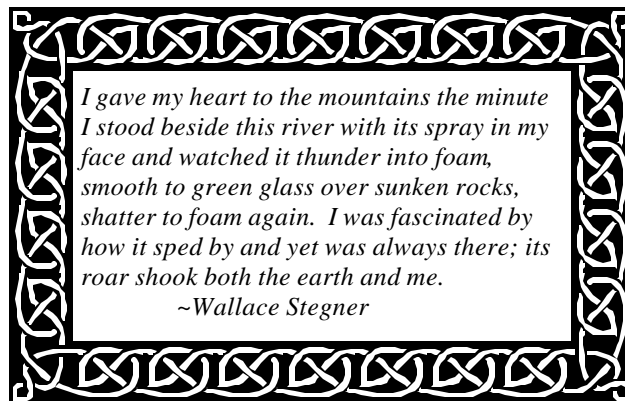
Heinz Center Report: The State of the Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States  
<http://www.heinzctr.org/ecosystems>

Watershed Signs  
[http://dipin.kent.edu.gov/Watershed\\_Signs.htm](http://dipin.kent.edu.gov/Watershed_Signs.htm)

Web-based training on watershed management  
<http://www.epa.gov/watertrain>

EPA Watershed Academy training courses  
<http://www.epa.gov/owow/watershed/wacademy/corsched.htm>

The "National Water Quality Inventory: 2000 Report"  
<http://www.epa.gov/305b/2000report>

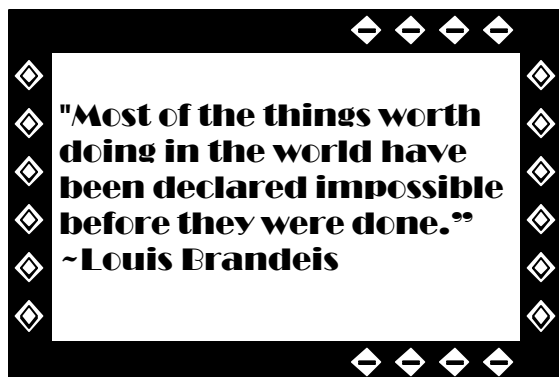


### ***International Year of the Mountain / Special Events in November***

**~Gene Reetz, EPA Region 8**

The United Nations has designated 2002 as the "International Year of the Mountain" (IYM) to recognize both the importance and fragility of mountain environments throughout the world. Within EPA Region 8, our mountains are especially important as sources of most of our water supplies, much of our regional biodiversity, as well as places many of us like to recreate. In observance of IYM, EPA has worked with the Denver Lodo Tattered Cover Book Store's "Rocky Mountain Land Series," the Colorado Mountain Club, and the University of Colorado's Arctic and Alpine Institute to have a series of free programs on the natural history of Colorado's mountains. Throughout November, a distinguished group of authors, naturalists, scientists, and historians will give presentations on various topics ranging from the tundra environment to stream ecology.

For more information on the specific events, contact **Jeff Lee** at the Lodo Tattered Cover (303) 322-1965 ext. 2729 or [jeffl@tatteredcover.com](mailto:jeffl@tatteredcover.com) or **Gene Reetz**, Wetlands Team Leader (303) 312-6850 or [reetz.gene@epa.gov](mailto:reetz.gene@epa.gov)



### ***Brownfields Grants***

~Kathie Atencio, EPA Region 8

The EPA's Brownfields Initiative was developed to empower States, communities, and other stakeholders in redevelopment to work together in a timely manner to prevent, assess, safely clean up, and reuse brownfields (contaminated or potentially contaminated properties). In January 2002, President Bush signed into law the *Small Business Liability Relief and Brownfields Revitalization Act*. This law provides more funding and expands the current Brownfields Program to assist communities to clean up and reuse brownfields sites. Under the new law, grants for assessment, revolving loan funds, and cleanup will soon be available through a competitive grant selection process.

A draft of the new **Brownfields Assessment, Cleanup, and Revolving Loan Fund Grant Guidelines** for Fiscal Year 2003 is now posted on the EPA Brownfields website <http://www.epa.gov/brownfields>. These grants provide funding and revitalization opportunities for communities by returning contaminated (or potentially contaminated) properties back to reuse. The current *proposed* due date for proposals for the Assessment, Revolving Loan Fund, and Cleanup grants is November 27, 2002.

EPA put the guidelines out on the website for public review and held two public meetings in Washington, D.C. on September 26, 2002 to discuss any comments submitted on the draft guidelines. Depending on the number of comments received, EPA plans to finalize the guidelines in early October 2002.

If you have any questions, feel free to contact one of the EPA Region 8 **Brownfields Team** by calling (303) 312-6037.



*A Well's Proximity to the House*

~Photo by Melinda J. Erickson

### ***Safe Drinking Water For All***

~Ellen Salvador, EPA Region 8

Is your drinking water safe? If you live in the city, your drinking water is treated and tested, but for 35% of farm workers surveyed in rural Colorado, safe drinking water is an almost unattainable luxury. Migrant farm workers depend on water supplied by labor contractors or growers from wells and other non-public water sources. Many of these sources are unmonitored and unregulated.

Can you imagine getting your water from an irrigation ditch? For some farm workers, this is an everyday reality. Agricultural run-off, laden with pesticides, nitrates, and other chemicals, collects in irrigation ditches and is drunk by farm workers. Shallow wells, less than 30 feet deep, are common drinking water sources in migrant camps and are often contaminated with nitrates and pesticides. Because some farm worker camps' water systems aren't regulated, who knows what else could be in their water?

The lack of information about drinking water quality in migrant farm worker camps led the EPA Region 8 Environmental Justice Program to begin the Migrant Farm Worker Drinking Water Project. The goal is to find camps and assess the safety of drinking water. The Safe Drinking Water Act protects public health through regulation of the nation's drinking water, as long as the water systems meet the following criteria:

1. serving a minimum of 25 individuals for at least 60 days/year, or
2. which have at least 15 service connections.

Some of the camps meet these criteria, but are not currently regulated. Getting these camps into the regulatory framework is a major project objective. Local health providers helped us locate 200 farm worker camps throughout Colorado. Of these 200, 24 camps may be large enough to be regulated, but only four growers gave us permission to test their water, giving us a total of 4 camps to sample. We tested for organophosphates and chlorinated pesticides,

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sulfates, nitrates, lead, total coliform, and *E. coli* bacteria. These samples are still being analyzed.

About 40,000-50,000 farm workers (some living here year-round) work Colorado's agricultural fields during the growing season which lasts from April to October. Isolated in camps furnished by labor contractors or growers, many workers suffer in silence from a high risk occupation and substandard housing conditions.

Lack of sanitation in the bathrooms and showers was a real eye-opener. At another camp, the only visible bathroom was a portable toilet which was located within 20 feet of the drinking-water well. The toilet proved too unsanitary for some workers, as proven by human fecal matter found around the camp. In addition to unsanitary conditions, overcrowding, structural problems, contaminated water, and poor rodent/insect controls, farm workers live in sub-standard housing conditions.

Agricultural work is the most hazardous industry in the United States. Everyday physical stresses and pesticide exposure compromise farm workers' health as illustrated in the table below.

Physical Stresses	Acute Pesticide Exposure	Chronic Pesticide Exposure
<ul style="list-style-type: none"> <li>back pain</li> <li>eye injuries</li> <li>arthritis</li> <li>lacerations</li> <li>sprains</li> </ul>	<ul style="list-style-type: none"> <li>skin, nose, and/or throat irritations</li> <li>headaches</li> <li>dizziness</li> <li>nausea</li> <li>fatigue</li> <li>difficulty breathing</li> <li>inflamed eyes</li> </ul>	<ul style="list-style-type: none"> <li>cancer</li> <li>reproductive problems</li> <li>fertility problems</li> <li>birth defects</li> <li>developmental disabilities</li> </ul>

Farm workers provide an essential backbone to our economy and well being. They plant and harvest our produce and put food on our table. We need to guarantee them common *luxuries* such as safe drinking water.

For more information, please contact **Ellen Salvador** at (303) 312-6543 or [salvador.ellen@epa.gov](mailto:salvador.ellen@epa.gov)

### ***EPA Region 8 Improves Its Environmental Performance***

~Jody Ostendorf, EPA Region 8

Have you ever looked around your home or your workplace and thought to yourself "we could do better" in terms of polluting less, reducing waste and increasing energy

efficiency? EPA's Denver office, Golden laboratory, and Montana office have taken a look around and decided that "yes" we can do better. To that end, in October 2001, our regional office formed an Environmental Management System (EMS) work team including representatives from each program office and was selected as an EPA EMS pilot. Our goal is simple but big: to bring a higher standard of environmental management to our office operations. An EMS is a continual cycle of planning, implementing, and reviewing our activities to exceed our regulatory obligations and improve our environmental performance. Our initial focus is on internal operations, such as our vehicle fleet, commuting to work, travel, energy and water use, hazardous wastes generated, paper, the Fitness Center, computers, batteries ... even how meetings and conferences are conducted.

Our office is already doing a lot to promote improved environmental performance. Our Performance Track program provides technical assistance and recognition to businesses that go the extra mile beyond compliance in their operations. The Energy Star program recognizes companies and products that exceed waste generation, pollution, and energy efficiency standards, with a designation that gives customers satisfaction in knowing they are buying "green" products and services. EPA's enforcement program encourages the development of EMSs and other environmentally beneficial projects as part of enforcement settlements.

But we've decided we can do more and show more leadership. All EMS members have received extensive training in identifying our environmental impacts and what we can do to control or reduce our impacts. And we've begun delivering training to our co-workers. Outreach will eventually extend to our partners, contractors, grantees, and suppliers to help them improve their environmental performance. The EMS will incorporate appropriate modifications into existing processes and systems wherever we can. A more streamlined system will allow us to intensify our efforts into a better functioning whole.

So, how do we do that? The EMS team developed a set of Guiding Principles to provide direction toward our goal of sustainability. Simply put, we will:

1. Reduce our use of natural resources and dependence on materials extracted from the earth. We will move toward operations based upon renewable energy and materials.
2. Reduce purchases, use and releases of man-made toxic substances.
3. Ensure that our decisions and actions protect all communities and people, regardless of location, income, or race.
4. Increase staff knowledge about EMSs and become effective EMS advocates to others.

In addition to the environmental benefits, we'll realize with our EMS, our office will be a stronger leader in protecting our precious resources. We'll have increased technical expertise and guidance for the regulated community, the public, and our partners so they can achieve their environmental goals.

For more information, please contact **Jody Ostendorf** at (303) 312-7814 or [ostendorf.jody@epa.gov](mailto:ostendorf.jody@epa.gov)

## ***Water Quality Standards - Biocriteria Part I*** ~Karen Hamilton, EPA Region 8

*This is the fifth article in a series describing how the Clean Water Act is linked to watershed planning and implementation. The previous articles described the Clean Water Act components that are analogous to a generic watershed plan, water quality standards, total maximum daily loads, and data for watershed management. Water Quality Standards were discussed in the Spring 2001 issue. The entire standards package includes a designated use for the water body, such as cold-water aquatic life, whole body contact, and agriculture; the narrative or numeric water quality criteria that are meant to be protective of those uses; and an antidegradation policy.*

People interested in water quality have long emphasized water chemistry to understand how polluted water is. However, chemistry alone does not always reveal whether a water body is supporting the plants and animals that someone would expect to find in a particular water body. For example, water that is in no way chemically harmful to living things may be flowing in a concrete ditch. The ditch habitat and its flow pattern would be unlikely to support many plants and animals (biota). Similarly, exotic or invasive species may change the food web or biotic community that would be expected even in an otherwise pristine area. Streams that have become wide and shallow due to loss of stream banks and their riparian areas will have a different assemblage of plants and animals (community) than a similar stream with intact banks and streamside vegetation. We know that aquatic biota are severely impacted by drought, even though the remaining water may be clean, while floods hardly register as a disturbance.

In addition to evaluating stream chemistry, we can "ask" the biota how supportive their environment is to them as they carry out a life cycle. Like taking water samples to analyze chemicals, we can sample a water body for plants and animals - typically, invertebrates, like insects and clams, and plants such as soft algae and diatoms. In a cold water mountain stream, unaffected by mining, you would expect low zinc levels, high oxygen levels, and low nitrogen levels. Likewise, a particular community of plants and animals would be expected in this stream. The species would be adapted to water with little turbidity, low temperature, high oxygen levels, faster water, and certain food sources and a certain physical structure. Many of the species may not be able to

withstand certain levels of dissolved metals, fine particles in the water, an abundance of vegetation stimulated by high levels of phosphorus or nitrogen, or competition from species that are taking advantage of high levels of organic pollution, such as sewage.

In an intensive survey in the late 1980's in Ohio, 431 sites in were assessed using instream chemistry and biological surveys. In 36% of the cases, chemical evaluations implied no impairment, but biological survey evaluations showed impairment. Recently, researchers found that nitrogen concentration was not a good indicator of eutrophication in the Yellowstone River. Eutrophication results from high nutrient levels which increases plant and algae growth, resulting in low levels of dissolved oxygen and decreased ability to support animal life. However, the amount of algae and community composition indicated availability and use of nitrogen even if it was not detectable in high concentrations. The researchers concluded that algal community indicators can provide an early warning of accelerated eutrophication processes, long before nuisance algal growths impair a stream use such as recreation.

Over the past 30 years, considerable research has revealed relationships between the structure of aquatic communities (i.e. the numbers and kinds of different organisms relative to each other in a particular place) and how impacted the water body is by human disturbances. Biologists have learned more about which species are tolerant of certain water quality problems like sewage or heavy metals, and which ones disappear from the scene when the environment changes due to, for example, pollution or habitat disturbance. Biologists have also been able to describe an expected community of plants and animals for a given kind of stream (e.g., northern sandy plains stream; southern rocky alpine stream) with minimal human disturbance. Such streams are "reference streams" and are used as a benchmark to evaluate impacts to the biotic community of a similar stream that has received pollutants or has been disturbed in some manner.

People are most familiar with criteria that describe chemical or physical attributes like dissolved oxygen, pH, or metals concentrations needed to protect a water use designation. However, criteria can be developed for biological conditions as well based on reference streams. Streams are sampled to evaluate the existing biotic community. The results are then compared to the expected picture of a community for that kind of stream. This comparison used with chemistry data can be a powerful tool to determine how well a stream is functioning and what might be keeping it from fully meeting expectations for that stream. In Biocriteria Part II I will describe in more detail the conceptual framework, the role of biocriteria in surface water management, and ecological and policy issues associated with biocriteria. Meanwhile, the Maine Bureau of Water Quality has a good treatment of biomonitoring and biocriteria at <http://www.state.me.us/dep/blwq/biohompg.htm>



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## Natural News

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If you have an article concerning ecosystem protection, community based environmental protection, or watersheds; we would like to hear from you!

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Ecosystem Stewardship on the web: [http://www.epa.gov/region8/community\\_resources/steward/est.html](http://www.epa.gov/region8/community_resources/steward/est.html)

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